

WRITTEN TECHNICAL REPORT

Weighting: 70%

Module: ACMA4039 – Engineering Applications & Study Skills

Assessment: Root Cause Analysis – Technical Report

Student: Lucas Kenny

Student ID: 2517368

Engagement with Literature Skills (15 marks)

Mark awarded: 11 / 15

Lucas showed a reasonable engagement with literature related to risk management and RCA in the engineering and manufacturing sector. The report references a mix of academic journal articles, textbooks, and professional guidance, including Oduoza (2020), Galvin (2017), and the IMechE Code of Conduct. These sources are relevant and demonstrate awareness of the importance of risk management within engineering practice.

However, much of the literature is presented descriptively, with limited comparison between sources or explicit linkage back to the specific RCA case study.

What was done well

- Inclusion of peer-reviewed academic sources.
- Clear explanation of general risk management concepts.
- Appropriate reference to professional and ethical responsibilities.

What could be improved

- Stronger synthesis between sources rather than presenting them individually.
- Clearer linkage between literature and the specific RCA findings.
- More consistent academic tone and tighter referencing accuracy.

Suggested enhancement

- Add a comparison table summarising *different risk assessment tools* (RCA, PHA, Fishbone, 5 Whys), outlining their purpose, strengths, and limitations.

Knowledge and Understanding Skills (25 marks)

Mark awarded: 18 / 25

The report demonstrates a satisfactory understanding of risk management and RCA principles. Lucas clearly explains what risk management is, why it is important in manufacturing, and outlines the basic steps involved in conducting an RCA.

The explanation of Severity, Occurrence, Detection, and RPN is generally correct, and the report shows understanding of how mitigation actions can reduce risk. However, explanations often remain broad and are not always grounded strongly in the specific engineering system being analysed.

What was done well

- Clear explanation of core risk management concepts.
- Correct outline of RCA stages and scoring logic.
- Awareness of legal and ethical considerations.

What could be improved

- More detailed explanation of the engineering process under investigation.
- Stronger connection between theory and practical manufacturing application.
- More precise technical language in some sections.

Suggested enhancement

- Include a simple system diagram of the motor and gearbox assembly showing where failures occur.

Cognitive and Intellectual Skills (20 marks)

Mark awarded: 14 / 20

Lucas demonstrated basic analytical reasoning when justifying Severity, Occurrence, and Detection ratings. The explanation of why severity remained unchanged while occurrence and detection were reduced shows awareness of inherent risk versus controllable risk.

However, some justifications lack depth, and numerical changes are not always clearly explained or prioritised.

What was done well

- Logical explanation of why mitigation reduced RPN.
- Awareness that not all risks can be fully eliminated.
- Reflection on limitations of RCA.

What could be improved

- Stronger justification of scoring decisions.
- Clearer prioritisation of risks.
- More critical discussion of residual risk.

Suggested enhancement

- Add a before-and-after RPN comparison table highlighting the most critical risks.

Practical Application Skills (20 marks)

Mark awarded: 14 / 20

The application of RCA to motor and gearbox failures is relevant to manufacturing engineering and demonstrates practical awareness. The corrective actions proposed (switching motor supplier, adding torque limiters) are sensible and aligned with the identified causes.

However, the application would be stronger with more detailed technical data, clearer justification of decisions, and stronger linkage between failure mechanisms and mitigation.

What was done well

- Relevant industrial problem.
- Practical corrective actions.
- Clear reduction in RPN after mitigation.

What could be improved

- Greater use of real operational data or maintenance records.
- Clearer explanation of how corrective actions address root causes.
- More structured presentation of RCA results.

Suggested enhancement

- Include an annotated image or schematic of the motor/gearbox system highlighting failure points.

Transferable Skills for Life & Professional Practice (20 marks)

Mark awarded: 14 / 20

The report follows a basic technical report structure and includes key sections such as introduction, literature review, RCA results, and conclusion. The overall intent is clear, but clarity and professionalism are affected by grammatical issues, repetition, and inconsistent academic tone.

What was done well

- Clear attempt to follow the required report structure.
- Logical progression from theory to application.
- Inclusion of reflection on RCA strengths and limitations.

What could be improved

- Proofreading to improve grammar and sentence structure.
- More concise and formal academic writing.
- Clearer presentation of tables and figures.

Suggested enhancement

- Add a final summary flowchart showing *problem* → *RCA* → *mitigation* → *outcome*.

Written Report Mark Summary (70%)

Criterion	Mark
Engagement with Literature	11 / 15
Knowledge & Understanding	18 / 25
Cognitive & Intellectual Skills	14 / 20
Practical Application Skills	14 / 20
Transferable Skills	14 / 20
Total (Written Report)	71 / 100

Weighted Contribution to Module (70%):
49.7 / 70